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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/820,188	04/07/2004	Thomas Beckmann	510.1100	7423

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EXAMINER
AKRAM, IMRAN

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
01/06/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/820,188	BECKMANN ET AL.	
	Examiner	Art Unit	
	IMRAN AKRAM	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 October 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 6-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 6-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see top of page 6, filed 10/27/08, with respect to the rejection(s) of claim(s) 1 under Vidalin have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Vidalin but in obviousness form.

2. In regards to the rejection of claim 1 and its dependents under Barbir, Applicant asserts on pages 7 and 8 that Barbir discloses a diaphragm pump in lieu of the electrochemical hydrogen compressor. Examiner agrees with this assertion and withdraws previous arguments to that effect. However, the rejection still applies. Sans any structural details in the claim, the electrochemical hydrogen compressor of Barbir reads on the diaphragm selectively permeable for hydrogen. As Applicant discloses on page 8, the compressor of Barbir "separates hydrogen from byproducts of the reformate by applying a direct current across a proton exchange membrane." This can reasonably be interpreted to be a diaphragm selectively permeable for hydrogen.

3. In response to applicant's argument on page 9 that Michelfelder is nonanalogous art to the Barbir reference, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See In re Oetiker, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Michelfelder discloses an invention for recirculation for the reduction of contaminants-a goal of Barbir. Regarding claim 2, Michelfelder

discloses reducing contaminants emitted from the combustion of fuels as Applicant states in page 7 of the Arguments. This is very much a pertinent problem to overcome in the closely analogous process of fuel reformation disclosed in Barbir and common in the art.

4. In regards to the rejection of claim 4 over Barbir in view of Faye, Applicant asserts on page 9 that the Faye reference teaches away from the claimed invention in that it vents residual gas instead of recirculating it between the reformer and enrichment device. Examiner respectfully disagrees. The recirculated hydrogen of figure 4 can be deemed the residual gas and is brought back between the reformer and enrichment device 16 as shown.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 6, 7, and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Barbir (US 2004/0142215 A1).

7. Regarding claim 1, Barbir discloses a reformer for producing a hydrogen-containing reformate gas using raw materials, at least a first of the raw materials

containing carbon and hydrogen; a separator device configured to selectively separate the hydrogen-containing reformate gas into hydrogen and a residual gas, the separator device including at least one diaphragm selectively permeable for hydrogen; a recirculation system for recirculating an amount of the residual gas from a first location downstream of the separator device to a second location upstream from the separator device. (see paragraph 42).

8. Regarding claims 6 and 7, Barbir discloses a diaphragm pump that selectively pumps hydrogen for a recirculation system as a transport device (see paragraph 31).

9. Regarding claim 10, Barbir discloses a gas generation system configured to generate a hydrogen-containing gas from one of a liquid hydrocarbons and hydrocarbon derivatives for operating a fuel cell (see abstract).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 1, 3, 8, and 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vidalin (US 2002/0085963 A1).

14. Regarding claims 1 and 8, Vidalin discloses a gas generation system, comprising: a steam reformer **10** for producing a hydrogen-containing reformate gas using raw materials, at least a first of the raw materials containing hydrogen and carbon (paragraph 49); a separator device **22** configured to selectively separate the hydrogen-containing reformate gas into hydrogen (**26**) and a residual gas (**24**); a recirculation system for recirculating an amount of the residual gas from a first location downstream **24** of the separator device to a second location upstream from the separator device **62**. Vidalin discloses that the hydrogen is separated from the carbon dioxide using conventional separation equipment and methodology (paragraph 51), but not that it is a selective diaphragm. Vidalin, however, discloses a CO separation device **28** that removes hydrogen from the CO via semi-permeable membranes (paragraph 56) for

pure hydrogen feed. It would have been obvious to one having ordinary skill in the art at the time the invention was made to integrate the separation devices of Vidalin so as to separate the reformate into pure CO_2, CO, and H_2 streams in one step instead of two. See MPEP 2144.04 V.B.

15. Regarding claim 3, Vidalin discloses the second location is in an entry area where the raw materials enter the reformer (see figure 2).

16. Regarding claims 16-20, the separation process at **22** includes some hydrogen, carbon monoxide, water vapor, and fuel in the residual gas (see paragraphs 52 to 55)

17. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barbir as applied to claim 1 above, and further in view of Michelfelder (US 4,461,224).

18. Regarding claim 2, Barbir does not disclose the detail of the recirculation location being directly in front of the separator device. Michelfelder discloses the second location is directly in front of the separator device (See figure 2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to circulate the residual gas in front of the separator device as Barbir is capable of doing as much and Michelfelder teaches the advantages of doing as much: to increase purity, efficiency, and yield.

19. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barbir as applied to claim 1 above, and further in view of Faye (US 2003/0170514).

20. Barbir does not disclose an enrichment device configured to enrich the hydrogen-containing reformate gas with hydrogen disposed between the reformer and the separator device, wherein the second location is between the reformer and the

enrichment device. Faye, however, discloses a shift-stage (paragraph 11) between the reformer **17** and separation device **15** capable of enriching the reformate gas with hydrogen. It would have been obvious to one having ordinary skill in the art at the time the invention was made to include an enrichment device in Barbir to "clean" the reformate and increase hydrogen content for better efficiency of the process—a known concept.

21. Claims 9, and 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barbir as applied to claim 1 above, and further in view of Keefer (US 2002/0098394 A1).

22. Regarding claims 9 and 11, Barbir does not disclose the use of an autothermal reformer or the type of fuel used in the process. Keefer, however, discloses the use of an autothermal reformer in conjunction with gasoline (paragraph 12). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use an autothermal reformer as they are more appropriate for the processing of heavier fuels—such as one of the most common: gasoline—as taught by the Keefer.

23. Regarding claims 12-15, Barbir does not disclose the intended use of the fuel cell apparatus. Keefer, however, discloses the device as an auxiliary power unit for automobiles (paragraph 13). Automobiles are read to include internal combustion engines. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the fuel cell apparatus of Barbir as a power unit for any transportation device with an internal combustion engine as this prevalent use of fuel cell systems and patents.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IMRAN AKRAM whose telephone number is (571)270-3241. The examiner can normally be reached on 10-7 Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

IA

/Alexa D. Neckel/
Supervisory Patent Examiner, Art Unit 1795